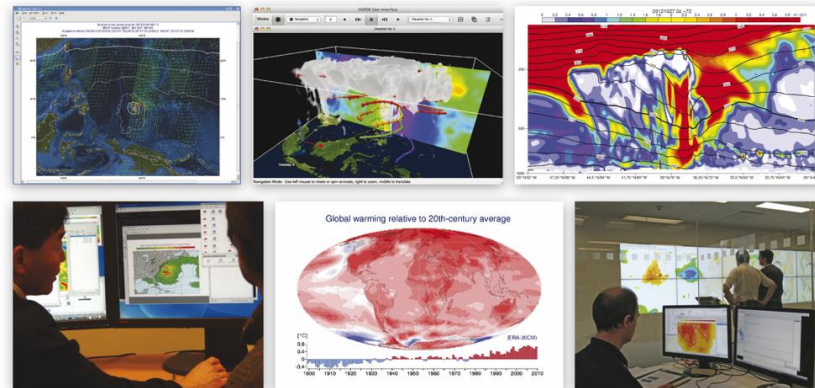# Code contribution for ECMWF software

ECMWF software strategy and its implications

Stephan Siemen
(on behalf of Baudouin Raoult, ECMWF Software Strategist)

ECMWF

ECMWF's new Software Strategy

- Follows changes in recent years

  - Creation of Development section

  - Improvements in the Software Support infrastructure (Atlassian tools: Jira, Stash, Bamboo, …)

- Aims to formalise and clarify how Software developments are directed

- Wants to give users a voice through Software Board

- Make it easier for external partners to use and improve ECMWF software

  - Users will be allowed clones of ECMWF software to implement changes

Categories of software

- The Integrated Forecasting System (IFS) and its associated, scripts, tools and libraries.

- System software, i.e. programs, scripts and tools that are necessary to run a computing centre.

- Enterprise IT software (i.e. office software)

- Specialist support software that provides a unique set of tools and services to manage, process, plot, and analyse data and products.
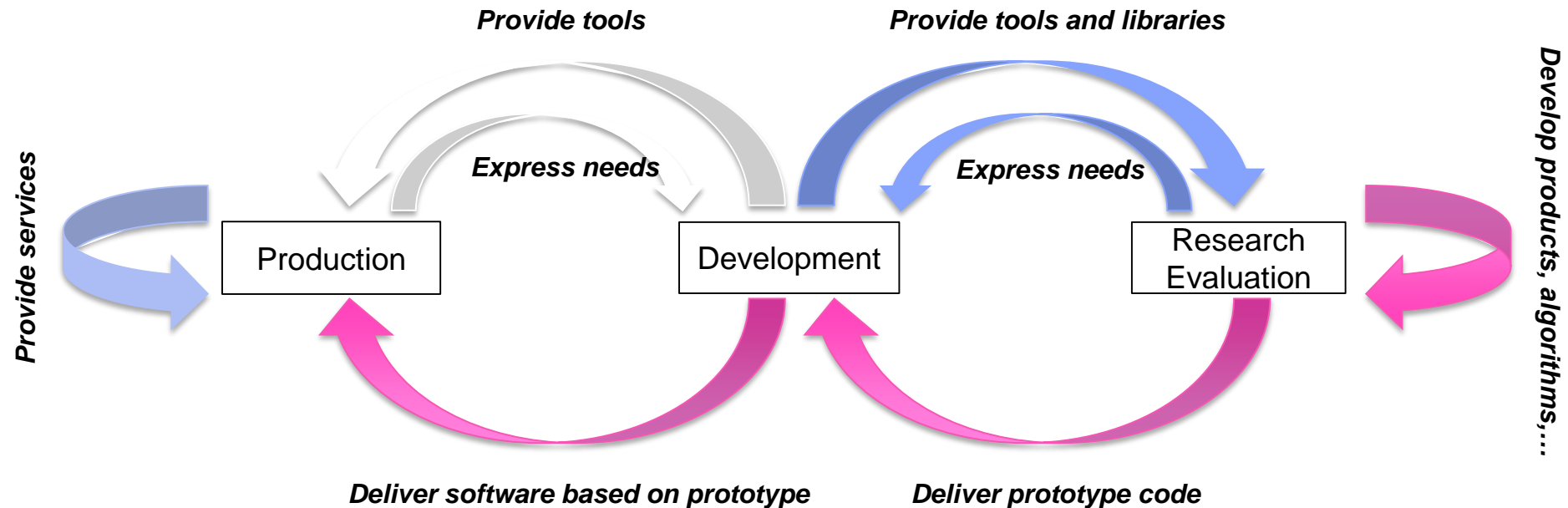
Scope of the strategy is the latter

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General principles (within ECMWF)

- Developing a rich set of software tools and libraries that address specific users' requirements, in particular internal users from Research and Evaluation, so that they can perform their tasks with optimal efficiency, while ensuring that there is no duplication of effort.

- Ensuring that there is a process by which any prototype developed by Research or Evaluation can become part of the production suite, provided it is of satisfactory quality and that there is a sufficient level of support.
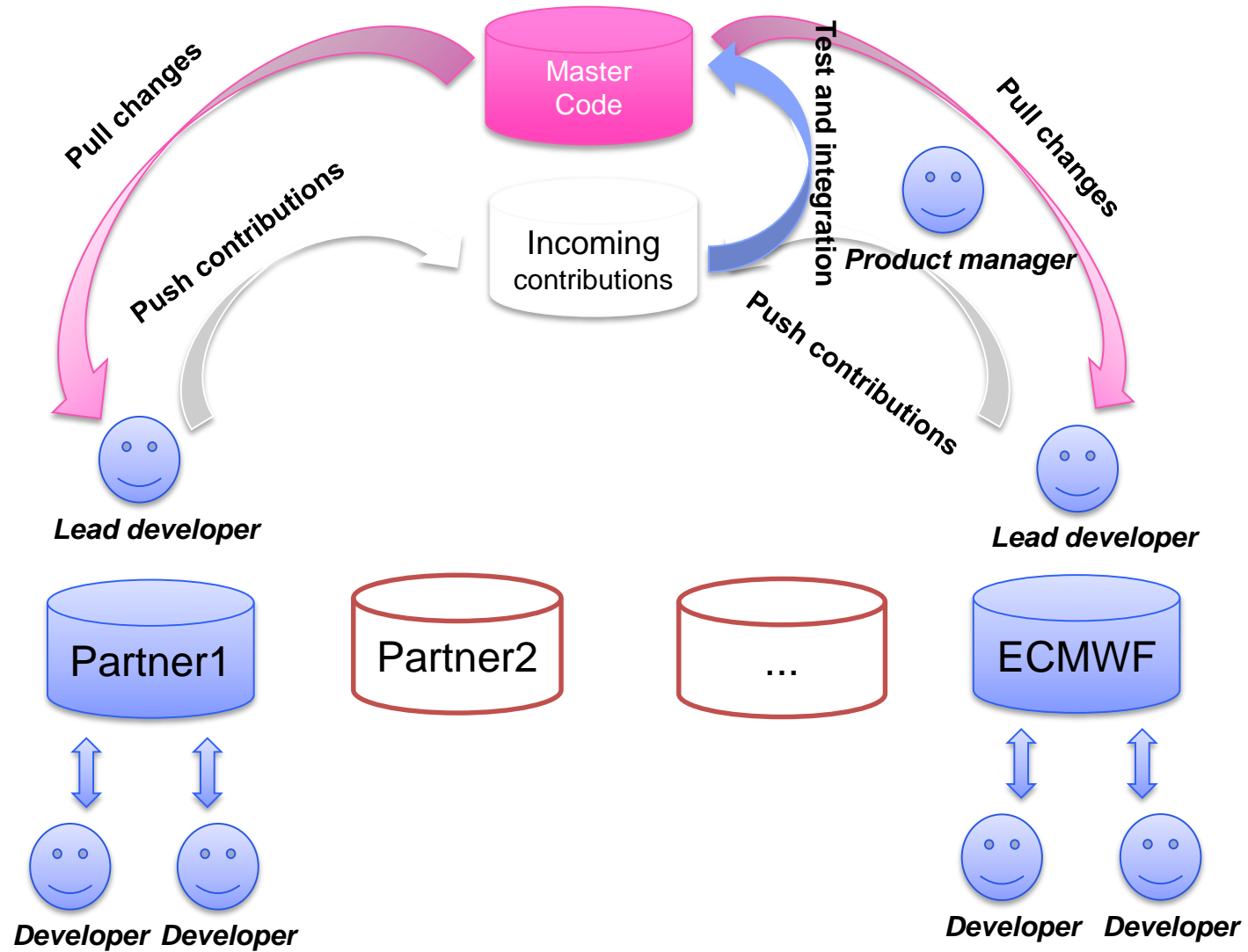
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Software development at ECMWF

The Development Section will maintain a "software toolbox" composed of code developed at the Centre, as well as relevant off-the-shelf software.

Provide tools

Provide tools and libraries

Develop products, algorithms,...

Provide services

Express needs

Express needs

| Production | | Development | | Research Evaluation |

Deliver software based on prototype

Deliver prototype code

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General principles (with external partners)

- Establishing a framework to facilitate and promote software development collaboration involving ECMWF and its Member States or other relevant organisations, in order to reduce costs by sharing resources.

- Engaging with community driven software developments, by providing procedures that allow external contributions to the Centre's software and by contributing directly to external Open Source software development when appropriate.

ECMWF

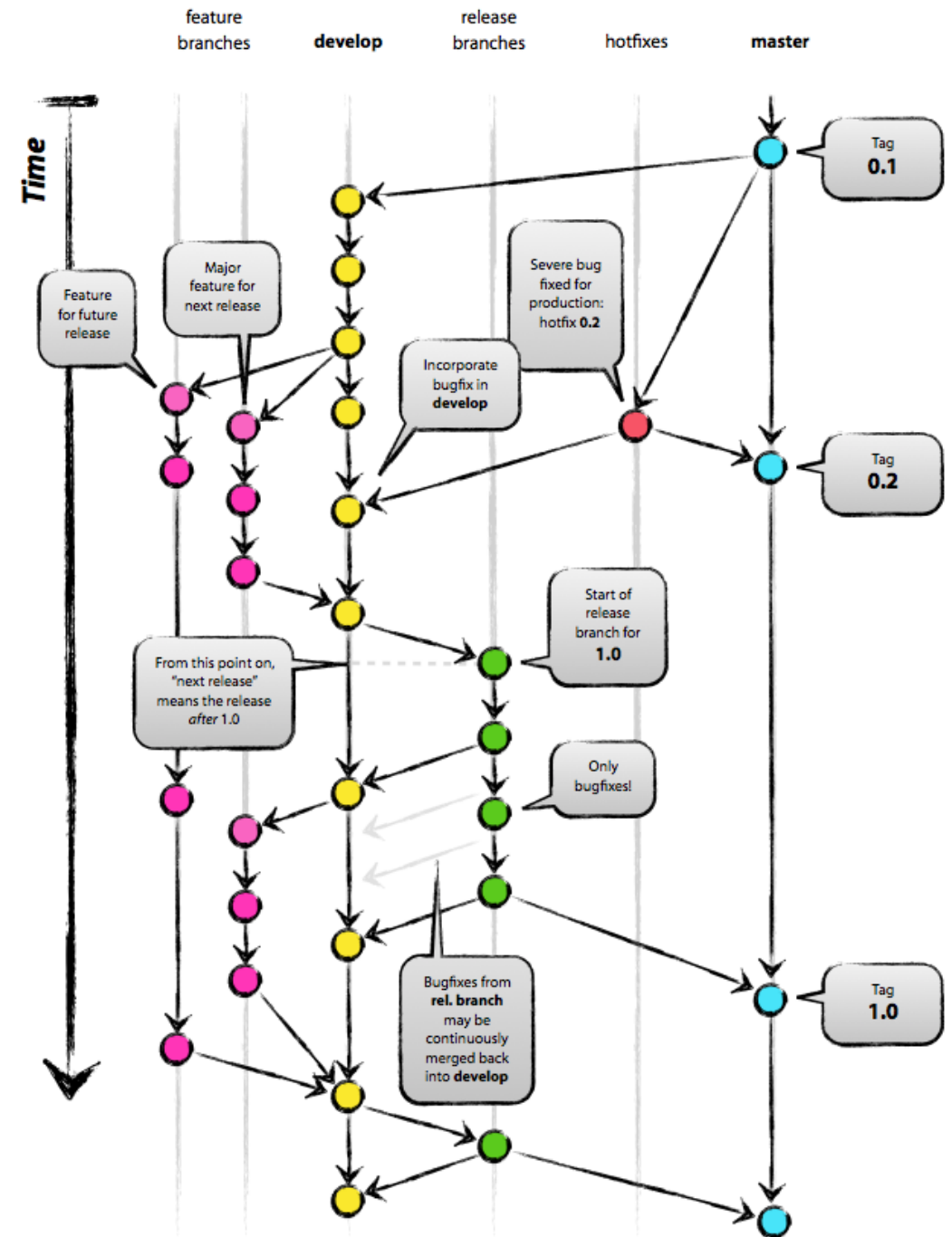# Establishment of a collaboration platform

- Engagement with other groups
  - E.g. WMO, UCAR's UNIDATA and the Open Geospatial Consortium (OGC)
- Supporting software developments in the Member States
  - Provide office space to visiting developers
  - Specific software development requests if funded
- Outsourced software developments (e.g. Copernicus)
  - Software board to identify developments that can be outsourced

ECMWF

Processes: managing ever growing complexity

- Managing software life cycle and versioning
- Efficiency and quality: better QA, automatic testing, continuous integration, etc
- More formal processes for software development (Waterfall, Agile?)
  - Ensuring that the software fits the requirements
  - Documentation, bug tracking, feedback…
- Excellence and skills:
  - Training, technology surveys

ECMWF

Using git

- Well established in the wider development community
  - Lots of documentation & training material & tools
  - Many other versioning systems allow git interface

- Allows co-operation

- Needs a common workflow!
  - ECMWF choose the well established git workflow →

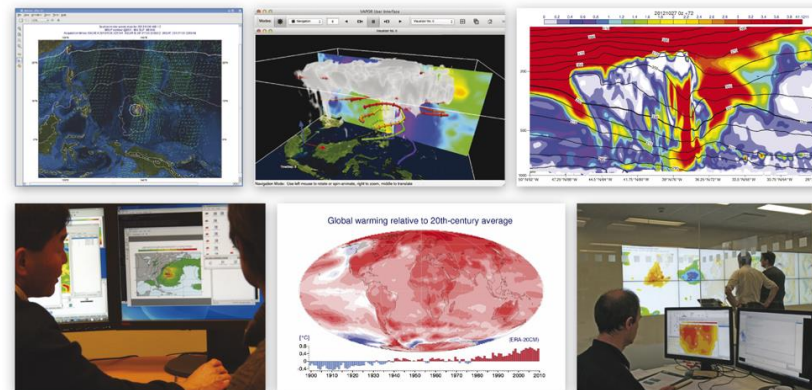- We use Atlassian Stash (Bitbucket server) as a web interface

- This presentation
  - Gather interest from the wider community (e.g. EGOWS)
- In the pipeline:
  - Get advice from legal team for contributions/collaboration
  - Setting up contribution framework using Atlasian tools (git, stash,confluence)
  - Pilot projects: COPE, ecCodes
  - Investigate Atlasian's Bamboo for automatic build and testing
- Coming soon:
  - An inventory of all software packages
  - A preliminary roadmap
  - A survey to capture RD and Evaluation needs

ECMWF

Co-operations

How can we work together

Stephan Siemen

What is ECMWF?

- ECMWF is an NWP centre for the medium-range

  – Running operational forecasts

  – Develop & operate meteorological archive (MARS)

  – Meeting place for technical and scientific knowledge exchange

- ECMWF with its small size can not do it alone

  – We need to cooperate our Members States

  – This was always the case!